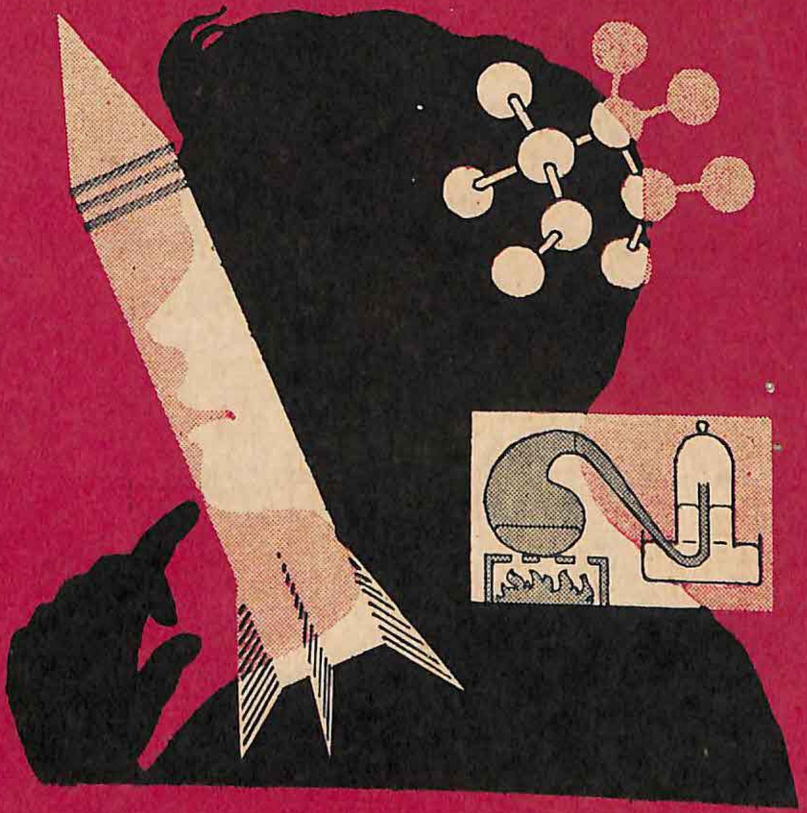
WORKBOOK FOR SCIENCE IN EVERYDAY LIFE

BOOK TWO

2063

by
A. VERSTRAETEN
and
N. A. WATTS



ORIENT LONGMANS

WORKBOOK FOR
SCIENCE IN EVERYDAY LIFE

BOOK TWO

SELF-TESTING EXERCISES TO ACCOMPANY
THE TEXT-BOOK

2063
5737

By
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With a Foreword by
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2063

FOREWORD

As a result of the advances in Science and Technology the vocational foundations of the structure of Society are changing and, therefore, it is essential for all Secondary School pupils to be familiar with certain scientific ideas which underlie progressive thought and activity at all levels.

The purpose of this series of General Science books is to provide such pupils with a broad basic knowledge of scientific facts.

Mere instruction in Science will not capture what is termed the 'spirit of science'. Westaway rightly points out: "The spirit of science cannot be weighed and measured even if weighing and measuring are necessary for tracking it down. It is not enough to track it down, it must be captured...." The authors have succeeded, I believe, in presenting scientific ideas in a manner which will not only instruct but interest pupils and thus help them to capture the spirit of Science.

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SCIENCE IN EVERYDAY LIFE

Books I, II, III and IV

Workbooks I, II, III and IV to accompany each text-book.

Teachers' Manual including Key to Workbooks.

PREFACE

Science has come to form such an integral part of our daily lives that a knowledge and understanding of its facts is regarded as one of the major goals of education. Furthermore, the development of a scientific attitude and a knowledge of how to apply the methods of science to the solution of personal problems is regarded as an important outcome of the educational process.

The workbooks accompanying the series of books entitled 'SCIENCE IN EVERYDAY LIFE' are designed to meet the problems of learning meaningful scientific facts and their translation into life patterns. They include material and suggested experiences through which the student can check his knowledge of facts, clinch his understanding of the basic concepts developed in the text and gain practice in the skills of solving problems, evaluating and interpreting facts, testing hypotheses, formulating generalisations and applying his understanding to everyday situations. The tests in the workbook also furnish the teacher with an instrument of measuring individual pupil differences in capacity and achievement and the status of the class as a whole, while a critical survey of the scores afforded by the tests reveal the efficiency of certain methods of instruction.

Each workbook contains tests which are constructed parallel to the chapters in the text-book it accompanies, so that the student's mastery of each chapter is facilitated. At the end of each part or book are tests which require the integration of the knowledge gained in the preceding chapters in order to be answered correctly.

The sheets in the workbook may be distributed separately in schools where a loose-leaf file is in use for the subject, or the workbook can be used intact. In either case, the corrected exercises should be readily available as a reference for study and review.

The key for each workbook is included in the Teachers' Manual accompanying the series of text-books.

A. VERSTRAETEN
N. A. WATTS

NAME______________________________ CLASS____________ DATE____________

TESTS ON CHAPTER I

THE PRESSURE OF THE ATMOSPHERE

Recall

1. Answer the following questions.

a. What fact determines the greatest depth from which it is possible to pump water from a well by means of a lift pump?

b. What advantage does the aneroid barometer have over the mercury barometer?

c. How would you expect the normal reading of a mercury barometer to be affected if it is taken:

i. Into a room in which a fire is burning?

ii. To the bottom of a mine?

iii. To the top of a skyscraper?

d. How is the disadvantage of the simple force pump corrected by the introduction of a compressed air chamber?

e. What difference is there in the arrangement of the valves in:

i. A force pump as compared with a lift pump?

ii. A football pump as compared with a bicycle pump?

f. What advantage does the simple force pump (i.e. a force pump without a compressed air chamber) have over a lift pump?

____

g. State three different methods of creating a partial vacuum within an enclosed space.

i. ______________________________

ii. ______________________________

iii. ______________________________

h. State the kind of weather usually accompanying:

i. A low pressure area.

____

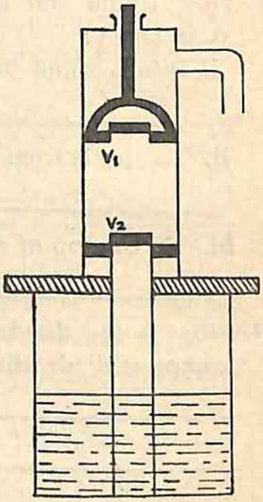
ii. A high pressure area.

____

Recognition

2. The diagram shows a section of a lift pump. Fill in the blank spaces with any one of the following words: air, water, opens, closes. (*N.B.* Each of these words may be used more than once.)

On the first upstroke of the piston V_2________and________ flows into the cylinder while________rises in the pipe. On the first downstroke of the piston V_1________and V_2________.________ now escape through V_1. Further upstrokes of the piston result in nearly all the________in the pump being removed. When this happens V_2________and V_1________during downstrokes, while V_2________and V_1________during upstrokes. At this time________gushes from the spout during upstrokes.



V_1 Piston Valve.
V_2 Foot Valve.

3. If a statement is true, write the word 'true' on the blank space below the statement; if false, write the word(s) which should be substituted for the italicised word(s) to make the statement true.

a. Otto Von Guericke's experiment with the metal hemispheres proved *that nature abhorred a vacuum.*

____

b. A syringe works *by using atmospheric pressure.*

____

NAME ______________________ CLASS ____________ DATE ____________

c. The air pump is an example of *a compression pump.*

____

d. The valve of the siphon flush tank fails to close if *the copper ball becomes punctured.*

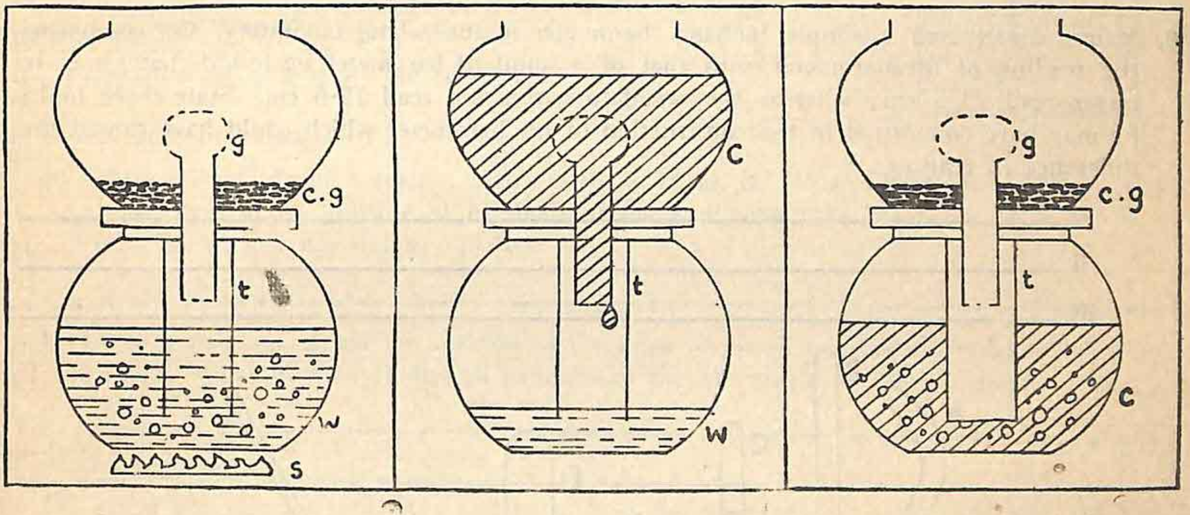
____

e. Water can be made to boil below 100°C. *by heating it in an air-tight container.*

____

Understanding

4. The diagram shows three successive stages in the preparation of coffee with the help of a two-level coffee maker. On the blank spaces write what happens at each stage.



c, coffee; c.g., coffee grounds; g. glass strainer; s. stove; t, tube; w, water.

i. ____

____

____

____

ii. ____

____

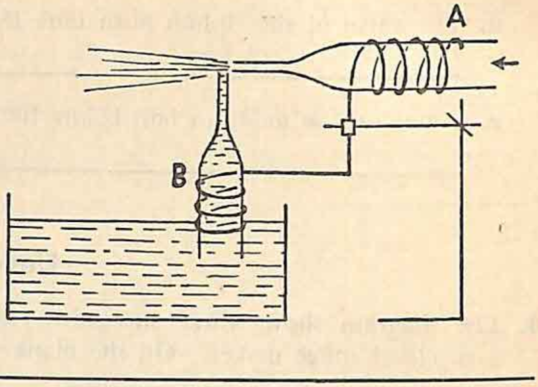
____

____

iii. ____

____

5. Two fountain-pen fillers, **A** and **B,** are supported as shown. When air is blown through **A,** in the direction of the arrow, a fine spray of water is produced. Explain.

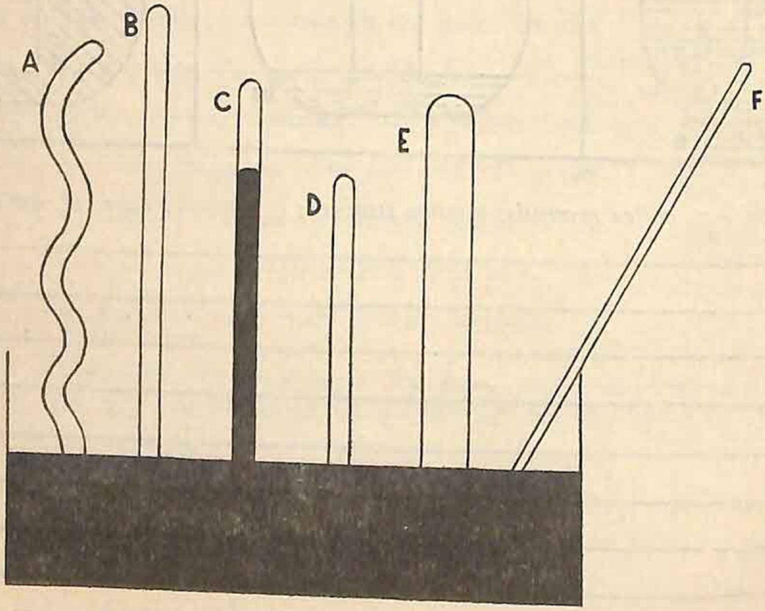


6. A boy constructed a simple mercury barometer in the school laboratory. On comparing the reading of his barometer with that of a standard barometer he found that his barometer read 74·5 cm., whereas the standard barometer read 75·6 cm. State three faults he may have committed in the construction of his barometer which could have caused the difference in readings.

i.______

ii.______

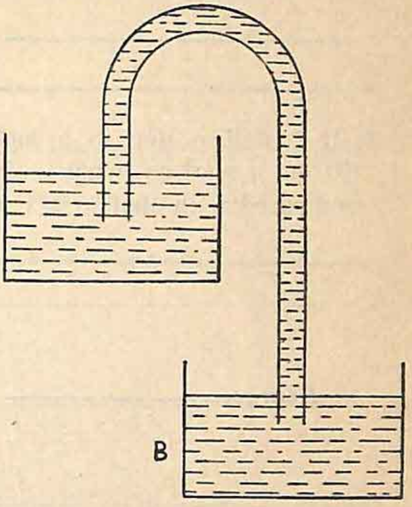
iii.______



7. **A, B, C, D, E** and **F** are glass tubes. The level of mercury in tube **C** is shown. Indicate, by shading, the level of mercury in each of the other tubes.

NAME ______________________ CLASS ____________ DATE ____________

8. A rubber tube is filled with water and its ends are placed in two beakers of water **A** and **B** as shown. Mark an **X** against all those statements in the following list which tell how the rate of flow of the water from **A** to **B** may be increased.



______ **a.** Using a longer tube.
______ **b.** Using a tube with a larger bore.
______ **c.** Using a tube with a narrow bore.
______ **d.** Lowering B.
______ **e.** Raising A.
______ **f.** Raising B.
______ **g.** Lowering A.
______ **h.** Increasing the size of A.
______ **i.** Increasing the size of B.
______ **j.** Making a hole in the tube.

9. Solve these problems.

a. The total surface of a certain man's body is 18 sq. ft. What is the total force of the atmosphere on the outside of his body at sea level when the barometer reads 30 in.? (1 cu. in. of mercury weighs ·49 lb.)

b. When a man sat on an air cushion, the volume of air in the cushion decreased to one quarter. What was the change of pressure of the air within the air cushion?

c. A fountain-pen filler is filled with ink and placed under a bell-jar. Explain what is likely to happen as the air in the bell-jar is removed.

d. An egg placed in an open kettle of boiling water takes a longer time to cook at the top of a high mountain than at sea level. Explain.

e. The nozzle of a sprinkler hose is first turned off and then the main tap which supplies water to the hose is turned off. Explain what happens when the nozzle tap is opened.

f. If a well is dug in a mountainous region where the atmospheric pressure is about 20 in. of mercury, what is the maximum depth from which the water can be pumped as compared with that at sea level?

Score:__________ **Teacher's initials:**__________

NAME______________________________ CLASS__________ DATE__________

TESTS ON CHAPTER II

PRESSURE IN LIQUIDS

Recall

1. What is meant by :

a. Force ?

____

____

b. Pressure ?

____

c. Cohesion ?

____

d. A Bathysphere ?

____

____

Recognition

2. Select the number of the item that best completes the statement and write it on the blank space at the left of the statement.

______**a.** If a wheel is so mounted that its rotation is brought about by a stream of water flowing over its upper rim the wheel is called (i) Pelton; (ii) overshot; (iii) undershot; (iv) breast.

______**b.** The hydraulic press is an application of the fact that (i) water seeks its own level; (ii) the pressure at any point in a liquid increases with depth; (iii) differences in atmospheric pressure produce a force; (iv) a force can be multiplied by transmission of pressure in a fluid.

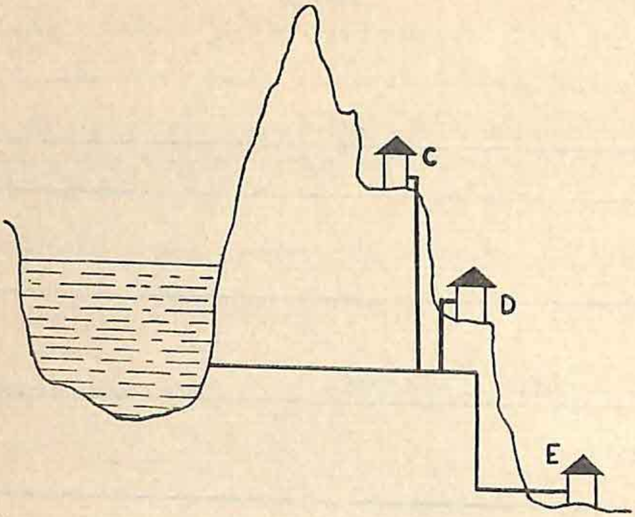
______**c.** The particles of a substance are most widely spaced in (i) gases; (ii) liquids; (iii) solids; (iv) fluids.

______**d.** Water is spread over the surface of the earth because of (i) the earth's spherical shape; (ii) the gravitational pull of the earth; (iii) the inclination of the earth's axis; (iv) the rotation of the earth on its axis.

______**e.** The pressure of water at the base of a dam depends on (i) the amount of water in a reservoir; (ii) the rate of flow of water into the reservoir; (iii) the rate of flow of water through the flood gates of the dam; (iv) the height of the water level in the reservoir.

Understanding

3. Study the diagram and then answer the questions below it.



a. Which house has the greatest water pressure? ______________________

b. Which house will need a pump for it to be supplied with water all through the year?
____

4. Solve the following problems:

a. A rectangular block of lead measures 10 cm. by 5 cm. by 3 cm. and weighs 1,710 gm. What pressure does the block exert when it rests on a horizontal surface so that: **(i)** its largest face is in contact with the surface ______________ and **(ii)** its smallest face is in contact with the surface? ______________________

b. The cross-sectional area of a small piston of a hydraulic press is 5 sq. cm. and that of the larger piston is 20 sq. cm. How much weight can be raised on the larger piston by a force of 25 gm. acting on the smaller piston? ______________________

c. What is the average pressure exerted upon the ground by a man weighing 150 lb. if the area of his boots in contact with the ground is 30 sq. in.? ______________________

Score: ______________ **Teacher's initials:** ______________________

NAME____ CLASS____________ DATE____________

TESTS ON CHAPTER III

SINKING AND FLOATING

Recall

1. What is the formula used to calculate :

a. The density of a substance ?

b. The relative density of a substance ?

c. The relative density of a solid by means of the hydrostatic balance ?

d. The relative density of a liquid by means of the relative density bottle ?

e. The density of a liquid by means of Hare's apparatus ?

f. The relative density of a liquid by means of a home-made wooden hydrometer ?

2. Define the following :

a. Archimedes' Principle.

____

____

____

b. Density.

____

c. Relative density.

____

____

3. State four important applications of the Principle of Archimedes.

i.____

____

____

ii. ______________________________

____

iii. ______________________________

____

iv. ______________________________

____

Recognition

4. In the case of each of the following pairs mark an **X** against the one that is more dense.

______ Air in an inflated football	______ Outside air
______ Air at sea-level	______ Air at a mountain top
______ Steam	______ Water
______ Ice	______ Water
______ Cricket ball	______ Tennis ball
______ Pine wood	______ Cork
______ Gas in airships	______ Air
______ Oil	______ Water
______ Iron	______ Mercury
______ Sea water	______ River water

5. The following list gives the relative densities in gm./c.c. of a number of solids and liquids: alcohol 0·8, carbon tetrachloride 1·6, gasoline 0·75, magnesium 1·74, ebony 1·15, ice 0·9, water 1·0, glycerine 1·26.

Which of these solids will:

i. Sink in all the liquids mentioned in the list? ______________________________

ii. Float in water but sink in alcohol? ______________________________

iii. Float in glycerine but sink in gasoline? ______________________________

Understanding

6. Solve these problems.

a. **i.** A piece of marble weighs 28 gm. and has a volume of 10 c.c. Calculate the density of marble.

____

NAME______________________ CLASS__________ DATE__________

ii. A piece of aluminium has a volume of 10 c.c. Calculate its mass. (Density of aluminium = 2·7 gm./c.c.)

iii. A piece of glass weighs 12·5 gm. Calculate its volume. (Density of glass = 2·5 gm./c.c.)

iv. A rectangular block of silver weighing 1,050 gm. has the following dimensions: length = 10 cm., breadth = 2 cm., and height = 5 cm. Calculate the density of silver.

v. A rectangular block of lead weighing 1,299·6 gm. has a height = 3 cm. and breadth = 2 cm. Calculate its length. (Density of lead = 11·4 gm./c.c.)

vi. 20 c.c. of milk weigh 20·6 gm. Calculate the density of milk.

vii. What will be the weight of a mixture of 20 c.c. of copper sulphate and 20 c.c. of water? Density of copper sulphate = 1·1 gm./c.c.

b. How is it possible to produce a block having the appearance and density of silver?

c. A solid weighs 200 gm. in air, and 175 gm. when completely immersed in water. Calculate:

i. The volume of the solid.

ii. The density of the solid.

d. While rummaging at home, a man found a ring of yellow metal in an old box. He wished to determine whether the ring was of gold (Density = 19·3 gm./c.c.) or brass (Density = 8·4 gm./c.c). Accordingly he weighed it and found that it weighed 9·65 gm. He next weighed it in water and found that it weighed 9·15 gm. Can you tell from this whether the ring was of gold or brass?

e. A piece of tin weighing 73 gm. is dropped into an overflow vessel. The water displaced is weighed and found to be 10 gm.

  i. Calculate the density of tin.

  ii. When the vessel is filled with aniline instead of water, the weight of the liquid displaced is found to be 10·2 gm. Calculate the relative density of aniline.

  iii. Calculate the weight of carbon tetrachloride of relative density 1·6 displaced by the piece of tin.

f. A piece of glass of density 2·5 gm./c.c. weighs 80 gm. in air. Calculate its apparent weight when completely immersed in :

  i. Water.

  ii. A liquid of density 1·84 gm./c.c.

g. A relative density bottle weighs 24·32 gm. when empty, 74·28 gm. when full of water, and 83·27 gm. when full of brine.

  i. Calculate the relative density of brine.

  ii. The bottle is emptied and then refilled with glycerine of relative density 1·26. What should be the weight of the bottle as filled with glycerine ?

h. The height of a column of salt solution and that of water, as recorded by Hare's apparatus, is 28·0 cm. and 33·2 cm. respectively. Calculate the density of the salt solution.

  i. Why is an aeroplane called heavier than air, whereas a balloon is called lighter than air ?

NAME ______________________ CLASS ____________ DATE ____________

j. A block of wood 20 cm. long and 100 sq. cm. in cross-section floats in water with 16 cm. immersed. Calculate :

i. The volume of water displaced by the wood.

ii. The volume of the wood remaining above the water.

iii. The weight of the wood.

iv. The additional weight that must be placed on the wood to make it float just below the surface of the water.

v. The density of the wood.

vi. The depth to which the wood will sink in a liquid having a relative density of 1·26.

vii. The relative density of a liquid in which the wood floats to a depth of 14 cm.

k. A hollow globe of zinc weighing 210 gm., when placed in a trough of water, floats just below the surface of the water. Given that the density of zinc is 7·0 gm./c.c., calculate:

i. The volume of the metal of which the globe is made.

ii. The volume of the cavity.

l. Nine-tenths of an iceberg, floating in fresh water, is submerged. How much weight must be placed on a 200-ton iceberg so that it is just completely submerged?

m. A loaded boat is lowered into a rectangular tank of water measuring 25 ft. by 15 ft. When the boat is floating in the tank, the water is observed to have risen by 3 in. Calculate the weight of the boat. (1 cu. ft. of water weighs 62·5 lb.)

n. A submarine with a total volume of 20,000 cu. ft. travels in sea-water with its upper surface level with the surface of the water. What change must be made in the weight of water in the tanks for it to remain at the same level when it moves into fresh water? (Weight of 20,000 cu. ft. of fresh water is 558 tons and of sea-water is 571 tons.)

o. Two sheets of paper are held vertically a few inches apart. Explain what happens when air is blown between them.

____

____

____

____

Score:__________ **Teacher's initials:**________________

NAME ______________________ CLASS __________ DATE __________

WHAT MAGNETS CAN DO

TESTS ON CHAPTER IV

Recall

1. What is meant by:

a. A magnetic field? ______________________

____

b. Induced magnetism? ______________________

____

c. A line of force? ______________________

____

d. A keeper? ______________________

____

Recognition

2. Place the following substances in their correct column.
Brass, cobalt, glass, iron, lodestone, nickel, steel, tin, wood, zinc.

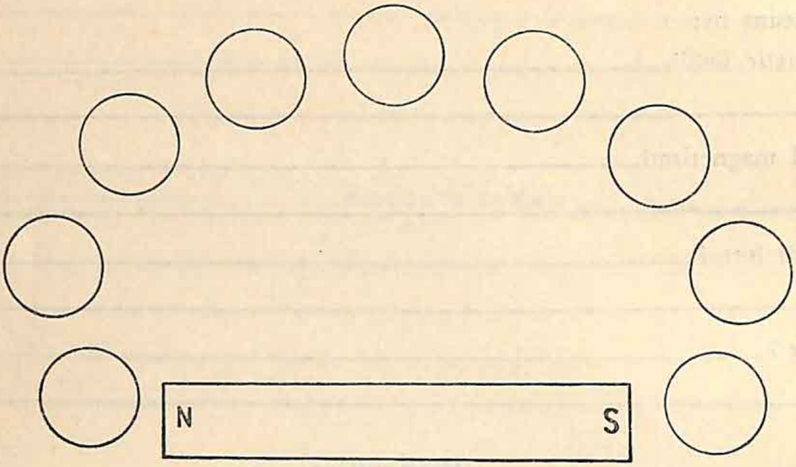
Magnetic substances	*Non-magnetic substances*
____________	____________
____________	____________
____________	____________
____________	____________
____________	____________

3. The poles of a bar magnet are brought in turn, near the poles of a compass needle in the order as outlined in the following table. Fill in the middle column with either the word 'attracts' or 'repels'.

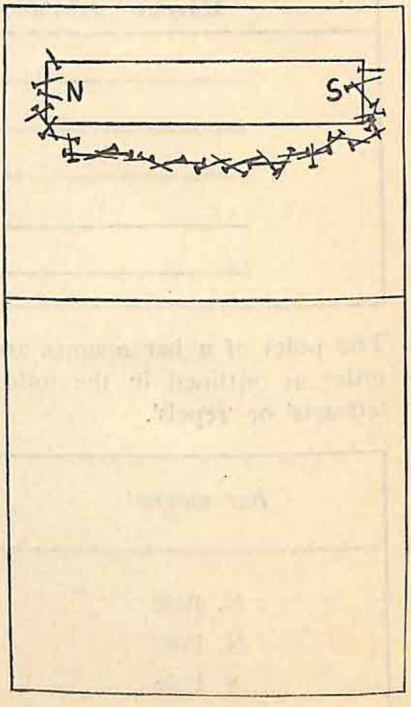
Bar magnet	*Attracts/Repels*	*Compass needle*
N. Pole	____________	N. Pole
N. Pole	____________	N. Pole
S. Pole	____________	S. Pole
S. Pole	____________	S. Pole

Understanding

4. On the diagram, insert an arrow in each circle to show the direction in which a compass needle points as it is moved from the North Pole to the South Pole and placed in each of the positions represented by circles.



5. A magnet is placed on a heap of small iron nails. When it is removed and held horizontally it is observed that several nails adhere to the magnet as shown in the diagram on the right.



a. Why have the nails adhered to the two ends of the magnet and not to the central portions of the magnet?

b. Why do the nails adhere to one another and form a chain?

c. In the space below the diagram, make a sketch to show the result of gently breaking the chain of nails in the middle. Indicate, by marking letters on your sketch, the North Pole **N** and South Pole **S** of each nail in the chain.

NAME ____________________ CLASS ____________ DATE ____________

6. In each of the following cases suggest one simple magnetic test by which you would distinguish between :

a. A bar of steel and a bar of soft iron.

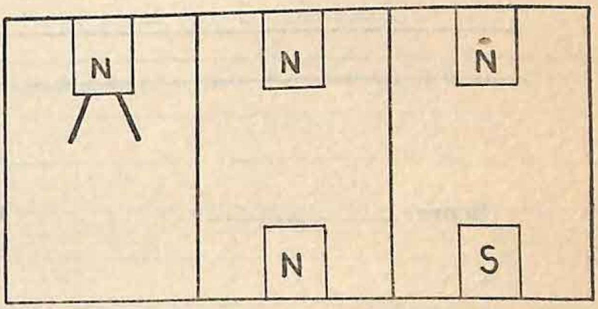
b. A bar of aluminium and a bar of iron.

c. A magnetised bar of steel and an unmagnetised bar of steel.

d. A weakly magnetised bar of steel and a strongly magnetised bar of steel.

7. Two darning needles of the same size and weight are suspended from the North Pole of a bar magnet as shown in the diagram on the left.

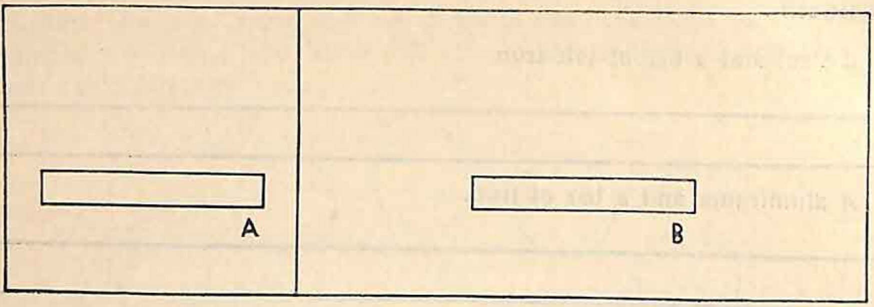
a. Explain why they do not come together at their lower ends.



b. The middle diagram shows a second magnet held below the first with its North Pole pointing upwards. Insert on the diagram the two pins showing the positions they occupy.

c. The diagram on the right shows the second magnet with its South Pole pointing upwards. Insert on the diagram the two pins showing the positions they occupy.

8. Both diagrams shown below represent a bar of steel.



a. Mark an arrow on the diagram on the left to show the direction in which the bar of steel must be stroked by a bar magnet that has its South Pole pointing downwards so that a South Pole will be produced at the end **A** of the bar.

b. In the case of the diagram on the right, insert a bar magnet showing the position it must occupy in order that the bar of steel may be temporarily magnetised by induction so that a North pole will be produced at the end of the bar marked **B.**

9. How would you magnetise a rod of soft iron if you had no other equipment but a large stone?

10. Explain how it is possible to magnetise a steel knitting needle so that it has a North Pole at either end.

Score:

Teacher's initials:

NAME____CLASS________________DATE________________

TESTS ON CHAPTER V

THE FIRST THINGS IN THE STUDY OF CHEMISTRY

Recall

1. Differentiate between each of the following pairs.

a. An element and a compound.

____

____

____

____

b. An atom and a molecule.

____

____

____

____

____

c. A physical and a chemical change.

____

____

____

2. In the table below, list in column 2 the chemical formula for each of the compounds listed in column 1, and in column 3, the elements of which they are composed.

Compound	*Chemical Formula*	*Elements of which the compound is composed*
1	2	3
Water		
Zinc nitrate		
Sodium hydroxide		
Hydrochloric acid		
Sodium chloride		

3. On the blank space at the left of each of the following elements write the symbol which denotes it.

________**a.** Phosphorus.

________**b.** Carbon.

________**c.** Calcium.

________**d.** Copper.

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______ e. Sodium.

______ f. Lead.

______ g. Magnesium.

______ h. Manganese.

______ i. Potassium.

______ j. Silver.

4. State :

a. Two facts that a chemical equation does not indicate.

i. ______________________________

ii. ______________________________

____

b. Three facts that a chemical equation indicates.

i. ______________________________

ii. ______________________________

iii. ______________________________

c. Four distinctions between a compound and a mixture.

i. ______________________________

____

ii. ______________________________

____

iii. ______________________________

____

iv. ______________________________

Recognition

5. On the blank spaces at the left of each of the following :

a. Indicate its nature by writing **E** for element, **C** for compound and **M** for mixture.

______ **i.** Air.

______ **ii.** Brass.

______ **iii.** Brine.

______ **iv.** Carbon dioxide.

______ **v.** Mercury.

______ **vi.** Iodine.

______ **vii.** Chalk.

______ **viii.** Glass.

______ **ix.** Sulphuric acid.

______ **x.** Steel.

b. Write the letter **P** against those items that may be classified as physical changes and the letter **C** against those that may be classified as chemical changes.

______ **i.** The evaporation of water.

________ **ii.** The magnetisation of a strip of iron.

________ **iii.** The digestion of a piece of meat.

________ **iv.** The souring of milk.

________ **v.** The softening of glass by heat.

________ **vi.** The dissolving of salt.

________ **vii.** The decay of a plant.

________ **viii.** The erosion of a rock.

________ **ix.** The glowing of the filament in an electric lamp.

c. Write the number of atoms in the molecule as indicated by its chemical composition.

__________ **i.** O_2

__________ **ii.** NH_3

__________ **iii.** H_2SO_4

__________ **iv.** $(NH_4)_2SO_4$

__________ **v.** $Cr_2(SO_4)_3$

Understanding

6. State the meaning of each of the following :

a. $11H_2O$

b. 2S

c. $ZnCl_2$

d. $2Al(OH)_3$

e. $H_2 + Cl_2 \rightarrow 2HCl$

W.B. [illegible]
Date 23.8.05

7. Write the formula of a compound, each molecule of which contains one copper atom and two groups of atoms, each containing one nitrogen atom and three oxygen atoms.

____

8. Express as an equation the fact that two molecules of hydrogen grouped together as a pair, each of which contains a pair of atoms, combine with a molecule of oxygen in which two atoms of oxygen are joined together, to give two molecules of a compound, each of which contains a pair of hydrogen atoms joined with an atom of oxygen.

____

Score:__________ **Teacher's initials:**__________

NAME ____________________ CLASS __________ DATE __________

TESTS ON CHAPTER VI

OXYGEN

Recall

1. a. In the space below draw a sectional diagram of the apparatus used in the laboratory preparation of oxygen. Label the diagram.

b. Write the equation, in words, for the decomposition of potassium chlorate by heat.

____

2. State :

a. Five properties of oxygen. Underline the most important.

i. ______________________________

ii. ______________________________

iii. ______________________________

iv. ______________________________

v. ______________________________

b. Two uses of oxygen.

i. ______________________________

ii. ______________________________

c. One simple laboratory test for oxygen.

____

Date 23.8.05
Acc. No. 11848

Understanding

3. Account for each of the following statements.

a. Although manganese dioxide neither yields oxygen when it is heated nor combines with potassium chlorate to produce oxygen, yet it is mixed with potassium chlorate in the test-tube in which oxygen is generated.

b. After the preparation and collection of oxygen, the delivery tube must be raised out of the water in the trough before the burner is extinguished.

c. A splinter burns more rapidly and fiercely in a jar of oxygen than in a jar of air.

d. People ascending to high altitudes carry a supply of oxygen with them.

e. Hydrogen peroxide is stored in brown bottles and kept in a dark place.

Score: ____________ **Teacher's initials:** ____________________

NAME____ CLASS________________ DATE________________

TESTS ON CHAPTER VII

CARBON AND ITS COMPOUNDS

Recall

1. a. What is 'dry ice'?

____

b. What is 'dry ice' used for?

____

c. State three advantages 'dry ice' has over ordinary ice.

i.____

ii.____

iii.____

____

2. Name five products that can be obtained from petroleum when treated in a special manner.

i.__________ **ii.**__________ **iii.**__________ **iv.**__________ **v.**__________

3. State:

a. Three ways in which graphite is different from diamond.

i.____

ii.____

iii.____

b. Three ways in which carbon monoxide is different from carbon dioxide.

i.____

ii.____

iii.____

c. One simple laboratory test for carbon dioxide.

____

4. Why can carbon form so many different kinds of substances?

____

____

Recognition

5. Group I is a list of the various substances mentioned in the chapter. Group II is a list of the various uses made of these substances.

At the left of each of the substances mentioned in Group I write the letters **Cr** if it is a crystalline form of carbon, **N-Cr** if it is a non-crystalline form of carbon, **Co** if it is a compound of carbon and **N-Co** if it is not a compound of carbon.

Select the numbers(s) of the use(s) made of each substance and write it (them) in the space at the right.

Group I

______ **a.** Carbon dioxide. ____________________

______ **b.** Carbon monoxide. ____________________

______ **c.** Chalk. ____________________

______ **d.** Charcoal. ____________________

______ **e.** Coal. ____________________

______ **f.** Coke. ____________________

______ **g.** Diamond. ____________________

______ **h.** Graphite. ____________________

______ **i.** Limestone. ____________________

______ **j.** Lime water. ____________________

______ **k.** Marble. ____________________

______ **l.** Milk of lime. ____________________

______ **m.** Quicklime. ____________________

______ **n.** Slaked lime. ____________________

______ **o.** Soot. ____________________

Group II

1. For statues. 2. For removing hair from animal skins prior to tanning. 3. For keeping things cold. 4. Manufacture of paints. 5. Production of tar. 6. Reagent for carbon dioxide. 7. Points for drills. 8. Production of naphthalene. 9. For extinguishing fires. 10. Manufacture of cement. 11. Extraction of iron from its ore. 12. Purification of water. 13. For making heavy soils lighter. 14. Manufacture of mortar. 15. Electrodes. 16. Manufacture of printing inks. 17. For improving soil. 18. Manufacture of plaster. 19. Manufacture of typewriter ribbons. 20. Lead of pencils. 21. Cutting glass, diamonds and rocks. 22. For releasing nitrogen and potash from insoluble compounds. 23. Production of aniline. 24. For absorbing gases. 25. Manufacture of boot polish. 26. Production of coal gas. 27. Manufacture of carbon paper. 28. Production of benzene. 29. Liberation of metals from their oxides. 30. Production of phenol. 31. Lubricant for machines. 32. For smelting. 33. For making babies' food digestible.

NAME______________________________CLASS__________DATE__________

Understanding

6. Describe what happens and name all the products formed when:

a. A flame is put to the open mouth of a jar containing carbon monoxide.

b. Chalk is heated to a high temperature.

c. Carbon monoxide is passed over copper oxide.

d. Water is added drop by drop to a large piece of quicklime.

e. Carbon dioxide is passed into water.

f. The plunger at the bottom of a fire extinguisher is banged against the ground.

7. What do the chemical formulae CO_2 and CO for carbon dioxide and carbon monoxide respectively indicate?

8. What is shown by the fact that carbon monoxide is inflammable and is a reducing agent?

9. Account for each of the following statements.

a. Baking powder makes a cake rise.

b. Quicklime must be stored in a dry place.

c. A thin white film is observed to form on the surface of a jar of limewater if it is left uncovered and allowed to stand for some time.

d. Slaked lime is sometimes added to the soil.

e. A burning candle is lowered into a well before it is deemed safe for a person to go down into it.

f. A limited amount of air is supplied when charcoal or coke is manufactured.

Score: ______ **Teacher's initials:** ______

NAME______________________________ CLASS__________ DATE__________

TESTS ON CHAPTER VIII

HOW A GREEN FLOWERING PLANT WORKS

Recall

1. What is meant by :

a. Osmosis ?

____

____

b. Osmotic pressure ?

____

____

c. Root pressure ?

____

____

____

d. Transpiration ?

____

____

e. Photosynthesis ?

____

____

f. A highly concentrated solution and a less concentrated solution ?

____

____

2. State :

a. Four external conditions on which the rate of transpiration depends.

i.____

ii.____

iii.____

iv.____

b. Two external conditions required for oxygen to be given off by the green plant.

i.____

ii.____

c. Four reasons why transpiration is considered to be of vital importance to the plant.

i. ________________________________

ii. ________________________________

iii. ________________________________

iv. ________________________________

____

d. Three factors which help in the passage of water from the roots to the top of a plant.

i. ________________________________

ii. ________________________________

iii. ________________________________

3. How is the food manufactured in the leaves used by the plant?

____

____

____

Recognition

4. Mark with an **I** those items that are true of an insect-pollinated flower and with a **W** those that are true of a wind-pollinated flower.

______ **a.** Corolla is brightly coloured.
______ **b.** Small and inconspicuous.
______ **c.** Flowers are unisexual.
______ **d.** Gives off a sweet scent.
______ **e.** Large amount of pollen is produced.
______ **f.** Pollen grains are sticky.
______ **g.** Stigmas are long and feathery.
______ **h.** Wasteful method of pollination.
______ **i.** Economical method of pollination.
______ **j.** Nectar is present.
______ **k.** Stigmas are sticky.

5. Group **I** is a list of plant parts. Group **II** is a list of functions. Select the number of the function which is best for each part and write it at the left.

Group I

____ **a.** Anther. ____ **b.** Chloroplast. ____ **c.** Guard cell. ____ **d.** Lenticel. ____ **e.** Ovary.
____ **f.** Petal. ____ **g.** Phloem. ____ **h.** Root-hair. ____ **i.** Vein. ____ **j.** Xylem.

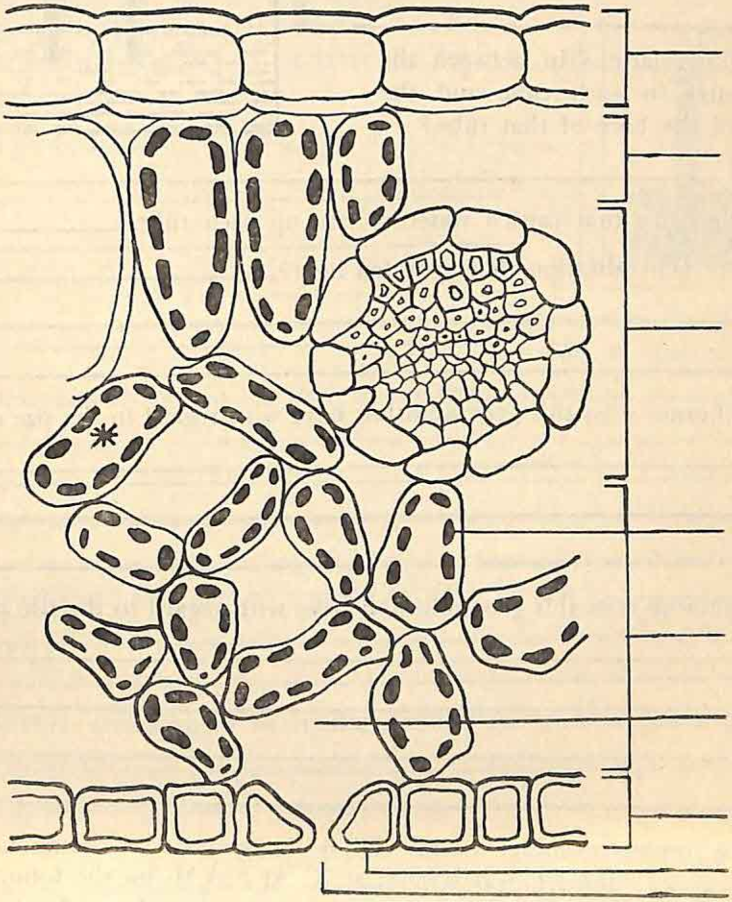
NAME________________________________ CLASS____________ DATE____________

Group II

1. Absorption of water and mineral salts. 2. Attracts insects. 3. Manufactures carbohydrates. 4. Transportation of manufactured food. 5. Regulates the opening and closing of the stomata. 6. Contains pollen grains. 7. Transports water to the leaf and manufactured food from the leaf. 8. Allows air to enter the plant body during the day and night. 9. Contains ovules. 10. Transportation of water.

Understanding

6. The diagram represents a section through the leaf of a green plant.



a. Label the parts indicated by guide lines.

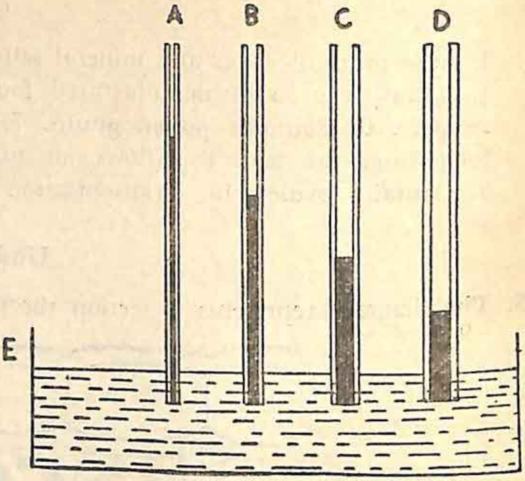
b. Indicate by unbroken arrows the passage of carbon dioxide molecules during the hours of sunlight.

c. Indicate by feathered arrows the passage of oxygen molecules during the hours of sunlight.

d. Indicate by broken arrows the path by which the sugar formed in the cell marked with a star passes out of the leaf.

e. Indicate by heavy-headed arrows the direction in which water moves.

7. The diagram on the right represents the apparatus used to demonstrate a certain scientific generalisation. **A, B, C,** and **D** are glass tubes of different bores while **E** is a trough containing water.



a. What has happened to the water in the trough and tubes?

____

____

____

b. What is the relationship between the rise of water in each tube and the diameter of the bore of that tube?

____

c. What is the force that caused water to rise up each tube? ____________________

d. What is the generalisation demonstrated here? ____________________

____

____

e. What significance does this generalisation have with regard to the size of soil particles?

____

____

____

f. What significance does this generalisation have with regard to the life of a plant?

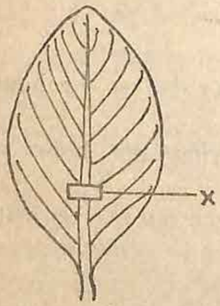
____

____

____

____

8. At 6 P.M. on a summer evening, the midrib of the guava leaf shown in the diagram on the left was severed at **X.** At 3 A.M. on the following morning, the entire leaf was removed from the plant, decolourised and thereafter placed in iodine solution.



a. Shade that portion of the leaf which became blue-black in the iodine solution.

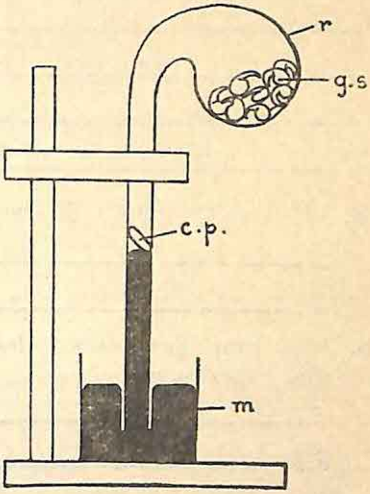
b. Explain why only part of the leaf became blue-black.

____

____

NAME ________________ CLASS ________ DATE ________

9. A flask with a bent bulb, called a respiroscope, is taken and some germinating seeds are placed in the bulb. The respiroscope is then inverted over a beaker of mercury as shown in the diagram on the right. A stick of caustic potash is taken and with the help of forceps introduced into the respiroscope (caustic potash has the property of absorbing carbon dioxide). After some hours the mercury is observed to have risen in the stem of the respiroscope.



c.p., caustic potash; g.s., germinating seeds; m, mercury; r, respiroscope.

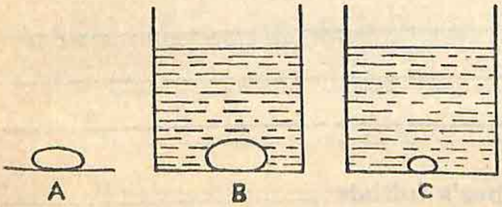
a. What is the object of the apparatus?

b. Why did the mercury rise in the stem of the respiroscope?

c. To what height will the mercury column continue to rise?

d. What difference would there be in the result if the stick of caustic potash was omitted from the apparatus?

10. In the diagram on the left, **A** represents a raisin, **B** shows a second raisin of the same size as the first after it has been left in a beaker of water for some time, **C** shows a third raisin of the same size and weight as the first after it has been left in a concentrated sugar solution for some time. Account for the appearance of raisins **B** and **C**.



B.

C.

11. a. What is the object of the apparatus?

b. State four observations that will be required to be made in this experiment.

i.

ii.

iii.

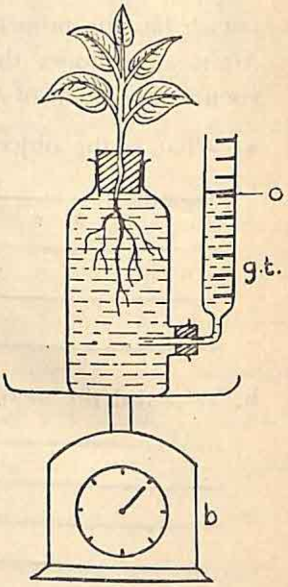
iv.

c. On what data would you base your conclusion?

d. Which two facts are indirectly tested in this experiment?

i.

ii.



b, balance; g.t., graduated tube; o, oil.

e. How would the results of the experiment be affected by placing the apparatus:

i. In the way of the blast of an electric fan?

ii. By covering the surface of each leaf of the plant with vaseline?

Score: ____________ **Teacher's initials:** ____________

NAME ____________________ CLASS __________ DATE __________

TESTS ON CHAPTER IX

FLOWERLESS PLANTS

Recall

1. Name :

a. The phase represented by the capsule in the life-history of the moss.

____

b. The phase represented by the prothallus in the life-history of the fern.

____

c. Four kinds of fungi that ruin grain and food crops.

i. __________ **ii.** __________ **iii.** __________ **iv.** __________

d. A skin disease caused by a mould.

____

e. The kind of fungus that causes mange on a dog.

____

f. A fungus that is used to make alcoholic liquids.

____

g. Two substances obtained from moulds that are widely used in medicine.

i. __________ **ii.** __________

h. The structures which contain spores in the fern plant.

____

2. A few yeast cells are placed in a sugar solution and kept in a warm cupboard. What changes take place in :

a. The yeast cells ?

____

b. The sugar solution ?

____

____

3. How does bread become infected by moulds ?

____

4. State three ways in which moulds can be useful.

i. ____________________

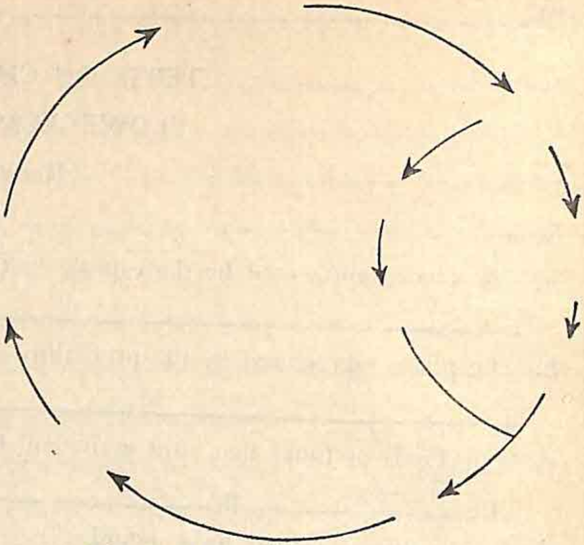
ii. ____________________

iii. ____________________

Recognition

5. Select the correct word from the list given below, and write it on the diagram in the proper place. When you have done this, draw a line through the diagram separating the sporophytic generation from the gametophytic generation.

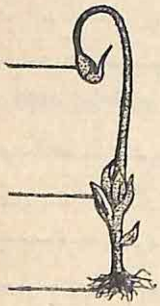
Fertilised ovum, spores, male organs, ova, capsule or sori, gametophyte, spermatozoids, sporophyte, female organs.

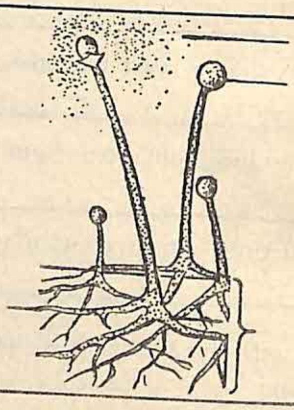


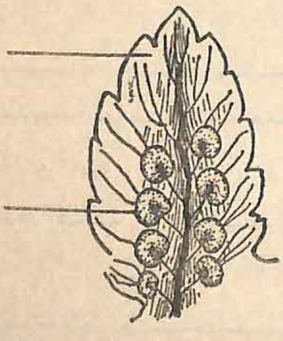
The life-history of a moss or fern.

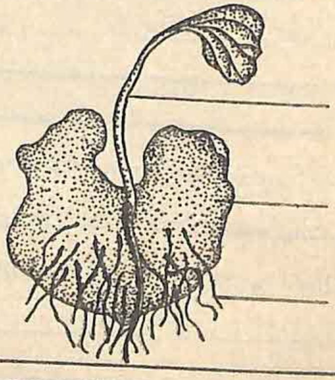
Understanding

6. Identify each of the following diagrams and label the parts indicated by guide lines.









Score:____________ **Teacher's initials:**____________

NAME______________________________________ CLASS____________ DATE____________

TESTS ON CHAPTER X

THE CELL: SINGLE CELLED ANIMALS

Recall

1. State :

a. Two differences between a plant and animal cell.

i.____

ii.____

b. Two uses of the trichocysts in paramecium.

i.____

ii.____

Recognition

2. Select the number of the item that best completes the statement and write it on the blank space at the left of the statement.

_____**a.** An organ is (i) a unit of protoplasm; (ii) the life substance of which all living things are made; (iii) a group of tissues organised to carry out a special activity; (iv) a group of similar cells organised to carry on the same function.

_____**b.** A chloroplast is an example of (i) a cell; (ii) a cell inclusion; (iii) a tissue; (iv) an organ.

_____**c.** Reproduction in the amoeba involves (i) the division of a single cell into two cells; (ii) conjugation; (iii) the union of a male cell with a female cell; (iv) separation of the nucleus from the cytoplasm.

_____**d.** The interchange by diffusion of carbon dioxide and oxygen takes place in paramecium through the medium of (i) the pellicle; (ii) the contractile vacuole; (iii) the trichocysts; (iv) the mouth.

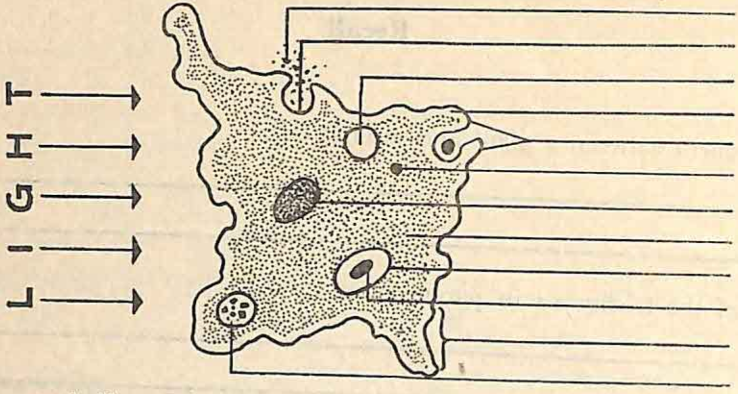
_____**e.** An amoeba forms a cyst (i) when it is feeding; (ii) when submitted to an electric shock; (iii) during the process of egestion; (iv) to escape from drying out.

3. On the blank space at the left of each of the following, write the numbers 1-5 to indicate the order of increasing complexity.

_____**a.** Complete living being. _____**b.** Organ. _____**c.** Cell. _____**d.** System. _____**e.** Tissue.

Understanding

4. The diagram represents a section of the amoeba.



a. Label the parts indicated by guide lines.

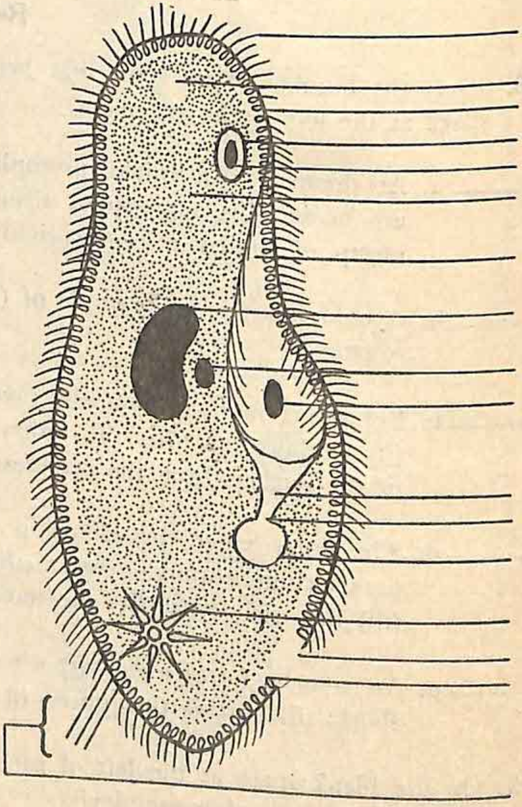
b. Show by means of a feathered arrow the direction in which the amoeba moves.

5. The diagram below represents a section of the paramecium.

a. Label the parts indicated by guide lines.

b. Indicate by unbroken arrows on the diagram the path taken by a food vacuole.

c. Show by means of a feathered arrow the direction in which the paramecium moves.



Score:______________ **Teacher's initials:**______________

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TESTS ON CHAPTER XI

OUR AMAZING CIRCULATORY SYSTEM

Recall

1. Answer the following questions.

a. Why are the two sides of the heart separated by a partition?

b. Why are the walls of the left ventricle thicker than the walls of the right ventricle?

c. How does the body try to increase the supply of oxygen during exercise?

d. How would you know if the blood flowing from a cut is flowing from an artery or from a vein?

e. Why do veins have valves?

f. How do the white corpuscles help in maintaining the body in good health?

g. How does the clotting of the blood in a wound occur?

h. How does the blood appear when a drop of it is examined under a microscope?

i. How is the oxidation that takes place in our body similar to that which takes place in a machine, and how does it differ from it?

j. How do you explain the rise in temperature during fever?

2. State five uses of the blood.

i. ____________________

ii. ____________________

iii. ____________________

iv. ____________________

v. ____________________

Recognition

3. If a statement is true, write the word true on the blank space below the statement; if false, write the word(s) which should be substituted for the italicised word(s) to make the statement true.

a. Most of the plasma consists of *water*.

____

b. The rate of blood flow is highest in the *capillaries*.

____

c. When the heart muscles relax, *blood is forced out of the heart*.

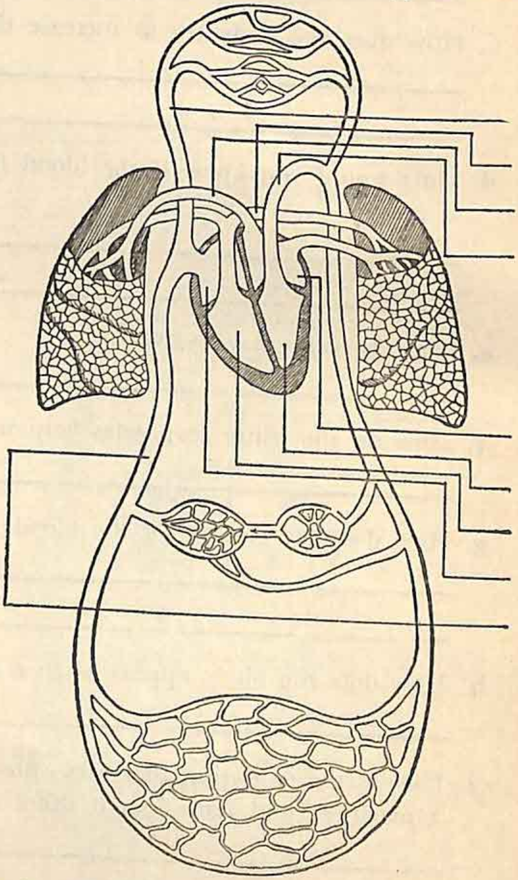
____

d. The work of the *kidney* is to ensure that the blood has the right amount of sugar that the body requires.

____

e. The heart resembles a *lift* pump.

____



Understanding

4. The diagram illustrates the course taken by the blood during its circulation around the body.

a. Label the parts indicated by guide lines.

b. Indicate by unbroken arrows the path taken by blood during its circulation.

c. Distinguish, by means of shading, oxygenated from deoxygenated blood.

Score: ____________ **Teacher's initials:** ____________

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TESTS ON BOOK II

1. Do this puzzle.

1					■	2	3		4	5
	■	6						■		
	■	■	■	7				■		
	■	8	9				■	■	■	
	10			■	11					
■				12	■	13				■
14					15	■	16			17
	■	■	■	18					■	
	19	■	20				■	■	■	
		■	21				22		■	
23					■	24				

Clues across

1. The outermost circle of leaf-like flower parts. 2. Yeast is required to make it rise. 6. A group of cells that are alike in structure and do the same kind of work. 7. A pollinating agent. 8. All plants that are of this colour can photosynthesise. 11. It carries blood away from the heart. 13. The smallest part of an element which keeps the property of that element. 16. It pollinates flowers at night. 18. An English scientist remembered for his work on air pressure. 20. It is measured in grams. 21. Hydrogen peroxide is able to do this. 23. A uni-cellular plant. 24. A blood vessel which carries blood away from the left ventricle.

Clues down

1. Paramecium is able to move by means of this. 3. The colour of haemoglobin. 4. It is all around us. 5. A natural process by which carbon dioxide is liberated into the air. 8. The most precious of metals. 9. A mould that ruins certain food crops. 10. A useful by-product of coke production. 12. A magnetic substance. 14. A structure in which seeds are formed. 15. Air enters our bodies through this. 17. The thread-like part of a mould. 19. It pollinates flowers by day. 22. The chemical formula for carbon monoxide.

2. State :

a. Two conditions for water to boil at 100° C.

i. ______________________________

ii. ______________________________

b. Boyle's law.

____

____

____

c. The law relating to the transmission of pressure in a liquid.

d. Two ways by which the magnetism of a magnet can be destroyed.

i.

ii.

e. Two differences in the structure of the red and white corpuscles.

i.

ii.

3. Distinguish between each of the following pairs.

a. Force and pressure.

b. A moth-pollinated flower and a butterfly-pollinated flower.

c. Xylem and phloem.

d. Sporophytic generation and gametophytic generation.

e. Nuclear membrane and plasma membrane.

f. Ingestion and egestion.

4. Name :

a. A substance which when added to water will make a solution which will conduct an electric current.______________________

b. A gaseous product when coal is strongly heated

i. In a limited supply of air.______________________

ii. In an excess of air.______________________

iii. In the absence of air.______________________

c. The structure through which oxygen enters a tree trunk.______________________

d. The type of pump used by a fire engine.______________________

e. Two ways by which the amoeba reproduces.

i.______________________ **ii.**______________________

f. The kind of blood vessel through which most materials go into and out of the blood.

____

g. The property by which an element can exist in two or more different physical forms which possess different properties.______________________

h. The unit constituting the organisation of all living beings.______________________

i. The part of a cell which controls its life and growth.______________________

j. Two conditions favouring the growth of moulds.

i.______________________ **ii.**______________________

k. Two ways by which the yeast reproduces.

i.______________________ **ii.**______________________

l. The most abundant element found on the earth.______________________

m. The material used to make a keeper for a horse-shoe magnet.______________________

n. The kind of magnet you would use to produce an intense magnetic field in a small space.______________________

o. The name given by ancient people to a piece of magnetic ore.______________________

5. Account for each of the following statements.

a. The height of the mercury column of a barometer falls when it is taken to the top of a high mountain.

____

____

b. A person floats more easily in sea water than in river water.

c. Although water is not absorbed by a plant through its leaves, yet a plant that shows signs of wilting revives if the air around its leaves is sprayed with water.

d. The walls of the left ventricle are thicker than the walls of the right ventricle.

e. Although carbon dioxide is continuously being produced during respiration, burning and decay, yet the proportion of this gas in the air remains small.

f. Shopkeepers usually keep a small horse-shoe magnet with them in order to distinguish 'good' coins from counterfeit coins.

g. Although starch is made in the leaves of a green plant, yet it is often found in roots and underground stems.

h. Kerosene oil rises up the wick of a lantern.

i. A greater pressure can be produced at a given point by standing on the heel of one foot, than by standing with both feet placed flat on the ground.

j. An iron ship does not sink, although it is made of a material that is denser than water.

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k. A swinging door moves inwards when another door in the room is quickly pushed outwards.

l. A bubble of gas rising to the surface of a pond expands as it rises.

m. A gas can be separated quite easily into two parts, but a solid can be separated only after some difficulty.

n. A fizzing noise is heard when the lid of an air-tight tin is punctured.

o. A keeper or bar of iron is usually fitted across the poles of a horse-shoe magnet.

p. A suspended magnet comes to rest with one end pointing North and the other end pointing South.

q. Although certain mineral salts are an essential food for plants, yet plants die if they are watered with a concentrated solution of such salts.

r. A bar magnet supported in a vertical position will hold up four nails, but only two gramophone needles each of which has the same size and weight as an iron nail.

6. In the case of each of the following mixtures, describe briefly how you would extract one constituent in a fairly pure condition.

a. Carbon monoxide and carbon dioxide.

b. Oil and water.

c. Copper filings and sawdust.

7. You are given four gas jars, each of which contains one of the following gases : oxygen, air, carbon monoxide and carbon dioxide. State one test by which you would identify each of them.

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